PROJECT 5E

Glenn-Colusa Irrigation District Glenn County Groundwater Monitoring Program and Model Development

1. Project Description

Project Type:	**Groundwater/surface water planning**
Location:	**Glenn County and the Stony Creek Fan**
Proponent:	**Glenn-Colusa Irrigation District (GCID or District)**
Project Beneficiaries:	**Groundwater users in Glenn County, agricultural water users, GCID, Tehama-Colusa Canal Authority (TCCA), Orland Unit Water Users' Association (OUWUA), Orland–Artois Water District (OAWD), downstream water users**
Total Project Components:	**Short-term components, develop groundwater model, install additional monitoring wells, support future conjunctive use projects in the county and facilitate the proper planning and management of those projects**
Potential Supply:	**To be determined – this project would support subsequent studies to determine potential supply from the Stony Creek Fan**
Cost:	**$5.7 million**
Current Funding:	**$250,000 (AB 303 grant)**
Short-term Components:	**Develop groundwater data clearinghouse, analyze existing data, design monitoring program, install new monitoring wells**
Potential Supply (by 2003):	**None**
Cost:	**$2.7 million**
Current Funding:	**$250,000 (AB 303 grant)**
Implementation Challenges:	**Local concerns regarding overdraft, land subsidence, and export of groundwater**
Key Agencies:	**GCID, Glenn County, California Department of Water Resources (DWR)**

Summary

The Stony Creek Fan within Glenn County has long been considered a groundwater resource with high potential for water supply benefits. The thick alluvial fan deposits combined with high rates of Stony Creek seepage indicate potential for groundwater storage and withdrawal. Implementation of a proposed conjunctive use project would require a thorough analysis of the groundwater system response. This proposed groundwater monitoring and modeling project is a necessary step to quantify the impacts and benefits of increased groundwater development in Glenn County. The geographic scope of the program is shown on Figure 5E-1.

The groundwater monitoring and model development project would support efforts in Glenn County to develop locally managed conjunctive use programs that may have the potential to supply up to 100,000 acre-feet (ac-ft) of groundwater for use during dry periods. The monitoring system would provide valuable data to develop accurate baseline information for modeling the groundwater basin and the impacts of potential conjunctive use operations. Glenn County does not have adequate funds to develop such a monitoring system in a timely manner.

The proposed project would support the Glenn County Groundwater Management Ordinance (Title 20, Chapter 3). The county does not intend to regulate the use of groundwater unless locally defined Basin Management Objectives (BMO) are violated. The BMOs are defined by local water users within hydrologic sub-areas of Glenn County. Maintaining and enforcing the BMOs are dependent on a well-designed monitoring program and groundwater model. GCID has recognized the need for funding and has taken a lead role in promoting this Glenn County monitoring and modeling project.

Funding assistance is needed to perform the following tasks: develop and maintain a clearinghouse for all existing groundwater monitoring efforts, determine additional monitoring requirements and design a monitoring program, install additional monitoring wells, and develop a groundwater model. The proposed groundwater program is expected to be completed by 2005, but has longer-term implications if groundwater development expands and conjunctive management of surface water and groundwater becomes more prevalent in Glenn County. The short-term and long-term components of the program are described below.

Short-term Component

Several tasks related to the countywide monitoring program would begin immediately after funding. The start of the project would only be delayed by the time required to hire staff or a consultant to support the proposed groundwater activities. The proposed short-term tasks described below would be completed by December 2003.

Clearinghouse for Groundwater Data

Hundreds of wells currently exist within Glenn County. Several wells are monitored for groundwater level by DWR on a seasonal basis. In addition, GCID monitors the levels in agricultural production wells that participate in the ongoing cooperative GCID groundwater program. Other entities such as municipalities, irrigation districts, U.S. Bureau of Reclamation, University of California, and U.S. Geological Survey monitor wells also. In

addition to obtaining groundwater-level data, some water quality data is required to fully evaluate the feasibility of additional groundwater development in the Stony Creek Fan.

The proposed groundwater data clearinghouse would establish monitoring standards and place all groundwater data into a single database. The database would likely reside within the Glenn County Public Works Department. The clearinghouse would promote coordination among public and private entities involved with groundwater resources. Establishing an organized groundwater database and making it accessible to interested parties would facilitate proper groundwater development and conjunctive use management within Glenn County.

Monitoring Program

Prior to expanding the current level of groundwater monitoring activities, an inventory of all wells would need to be undertaken. Location of wells and capacity information would be noted. Also critically important would be the elevation of well screening and identification of the corresponding geologic formation. Pumping from different aquifers would have different effects on local groundwater levels and the overall system. The monitoring program would establish monitoring standards for all county wells and determine the frequency of data collection and what parameters other than groundwater levels need to be measured.

Installation of Monitoring Wells

After a thorough examination of existing groundwater data and the geographic distribution, a determination would be made on the location and number of new monitoring wells. These wells would be "multi-completion" wells where the perched aquifer and all deeper-confined aquifers would be penetrated and monitored. In addition, extensometers on some new groundwater monitoring wells would measure land subsidence, which is the consolidation of soils after groundwater withdrawal. Land subsidence issues must be considered with any proposed groundwater project requiring proper data collection. GCID proposes that approximately 50 new monitoring wells may be necessary to adequately monitor the Stony Creek Fan. For the short-term component (through 2003) half of the proposed number of wells and two extensometers will be completed.

Long-term Component

The primary purpose of this evaluation is to evaluate the potential for this project to provide water supply benefits in the short-term (by end of 2003). As part of this initial evaluation, potential long-term components of the proposed project (defined as any part of the project proceeding past or initiated after December 2003) have been considered on a conceptual level. Further consideration and technical evaluation of long-term component feasibility and cost would occur as the next level of review under the Sacramento Valley Water Management Agreement. Long-term-component project descriptions are included in these short-term project evaluations only as a guide to the reader to convey overall project intent.

The proposed monitoring and modeling project is expected to last through 2005. Included in the long-term component of the program is continued monitoring of existing and new wells and maintaining the newly established groundwater data clearinghouse. Additional tasks of the long-term component (beginning in January 2004) are described below.

Installation of Additional Monitoring Wells

The installation of monitoring wells is expected to continue in 2004. Depending on the design of the monitoring network, the remaining number of new wells recommended during the design of the monitoring program would be installed. Up to 25 new wells are expected to be installed to complete the monitoring network.

Development of the Stony Creek Fan Groundwater Model

A model of the groundwater resources within the Stony Creek Fan and throughout Glenn County would be required to understand the impacts of an expanded groundwater withdrawal and possible recharge program within Glenn County. Another objective of the model would be to establish the hydraulic connection between the groundwater aquifers and the Sacramento River. This is critical for establishing optimal locations for pumping and recharge for a managed conjunctive use program and to determine safe levels of groundwater development. A calibrated model would also be a management tool upon implementation of a conjunctive use project. The model would use existing groundwater data collected in the clearinghouse process and data from new monitoring wells.

Prior to model development, coordination with the DWR Integrated Storage Investigations (ISI) would be necessary to avoid the duplication of engineering efforts. A detailed set of model objectives would be required prior to development with input from various water interests.

The calibrated model would allow the county to examine the potential impacts on the local water resources as a result of additional groundwater use. This would include impacts if the groundwater was used locally or exported to water-short areas, including south-of-Delta. The model would also predict long-term groundwater levels under varying levels of pumping and artificial recharge. The model would identify locations and quantities for the development of recharge basins.

Long-term Implications

The ultimate goal of the Glenn County groundwater program is to fully support future conjunctive use projects in the county and facilitate the proper planning and management of these projects. Several projects in the Stony Creek Fan within Glenn County are being proposed. This includes the DWR ISI and several projects proposed as part of the Sacramento Valley Water Management Agreement. These projects and their proposed timeframe are listed in Table 5E-1.

TABLE 5E-1
Proposed Groundwater Development and Conjunctive Use Projects in the Stony Creek Fan
Glenn-Colusa Irrigation District Glenn County Groundwater Monitoring and Modeling Project

Sacramento Valley Water Management Agreement Project	Proponents	Time Frame
Stony Creek Fan Conjunctive Water Management Program (Project 8A)	OAWD, OUWUA, GCID	Pilot studies completed 2003 to 2005. Long-term implementation could begin in 2005.
GCID Development of Conjunctive Water Management Facilities (Project 5B)	GCID	Pilot studies and partial groundwater well network completed by December 2003. Completion of plan and development of new wells by 2005.
OUWUA and TCCA Regional Water Use Efficiency (Project 9A)	OUWUA	Implementation in 2007 to 2010.

2. Potential Project Benefits/Beneficiaries

An objective of the proposed monitoring and subsequent modeling efforts is to address the proper management of the local groundwater resources that could in turn provide numerous benefits to Glenn County water users, downstream water users, and Delta water needs. This effort could quantify sustainable pumping quantities and the required recharge to maintain acceptable groundwater-level seasonal fluctuations and prevent long-term drawdown of the groundwater table.

Water Supply Benefits

The proposed project would evaluate the current level of monitoring, organize existing data into one database, determine the location of new monitoring wells, and continue to collect data. This process would be incorporated into a groundwater model that would assist any proposed conjunctive use project in the county. Ultimately, this monitoring and modeling project would lead to a managed conjunctive use project with real water supply benefits. This project would also be an opportunity for the general public to understand how the groundwater is impacted, both positively and negatively, with a managed conjunctive use program.

Primary beneficiaries of an implemented conjunctive use program would be agricultural water users in Glenn County. The new supply would supplement surface water supplies and firm up water needs in dry years for users such as GCID and TCCA. Downstream water users could also benefit if surface water normally diverted was made available after a conjunctive management program was implemented.

Water Management Benefits

Developing the tools for proper conjunctive management of surface water and groundwater supplies within Glenn County is the focus of this project. Proper management and an understanding of the impacts of increased groundwater development will be critical if any proposed conjunctive use projects are to be implemented. This monitoring and modeling project would be a necessary step for development. Another management aspect of the proposed project would be to combine all current monitoring efforts into one database,

which would promote cooperation within the groundwater basin. The proposed model would assist in determining how much operational flexibility a managed conjunctive use program would achieve.

Environmental Benefits

The proposed monitoring and modeling program would not directly provide environmental benefits, but would provide valuable information that could be used to evaluate future conjunctive use projects. Future conjunctive use projects would use the data and model to determine environmental benefits in terms of water quantity. Reduced surface water diversions by GCID, TCCA, or others results in more water in the Sacramento River and/or the Delta for potential environmental purposes such as in-stream flows or meeting water quality standards.

Water Quality Benefits

Water quality parameters would likely be measured and included in the groundwater data clearinghouse. Monitoring would help establish a baseline for groundwater quality and possibly identify sources of contamination. This program would identify how much influence a conjunctive use project would have on flows in the Sacramento River as well as inflows to the Delta.

3. Project Costs

The cost opinions shown, and any resulting conclusions on project financial or economic feasibility or funding requirements, have been prepared for guidance in project evaluation from the information available at the time of the estimate. It is normally expected that cost opinions of this type, an order-of-magnitude cost opinion, would be accurate within +50 to -30 percent. Project costs were developed at a conceptual level only, using data such as cost curves and comparisons with bid tabs and vendor quotes for similar projects. The costs were not based on detailed engineering design, site investigations, and other supporting information that would be required during subsequent evaluation efforts.

The final costs of the project and resulting feasibility will depend on actual labor and material costs, competitive market conditions, actual site conditions, final project scope, implementation schedule, continuity of personnel and engineering, and other variable factors. As a result, the final project costs will vary from the opinions presented here. Because of these factors, project feasibility, benefit/cost ratios, risks, and funding needs must be carefully reviewed prior to making specific financial decisions or establishing project budgets to help ensure proper project evaluation and adequate funding.

Table 5E-2 shows the anticipated short-term implementation costs of the Glenn County groundwater monitoring and modeling program. The costs of program elements that extend beyond December 2003 are shown in Table 5E-3. These costs represent the likely maximum number of monitoring wells required for an extensive program. The design of the monitoring program would include the basis for the number of wells and location throughout Glenn County. The number and location of monitoring wells with extensometers would also be determined in this project task. This cost estimate assumes that 50 monitoring wells would be installed and two of those would include extensometers.

TABLE 5E-2
Estimated Costs for Short-term Component
Glenn-Colusa Irrigation District Glenn County Groundwater Monitoring and Modeling Project

Task	Quantity	Units	Unit Price ($)	Total Cost ($ x1000)	Assumptions
Develop and Maintain Data Clearinghouse	2	Years	25,000	**50**	
Review and Design Monitoring Program	1	Each	25,000	**25**	
Install Monitoring Wells	25	Each	80,000	**2,000**	Multi-completion wells, includes geologist, mapping, recorder
Install Extensometers	2	Each	10,000	**20**	Additional cost on two multi-completion wells
			Short-term Program Cost Subtotal ->	2,100	
			Contingency (30%) ->	630	
			Total Short-term Cost ->	**2,730**	

TABLE 5E-3
Estimated Costs for Long-term Component
Glenn-Colusa Irrigation District Glenn County Groundwater Monitoring and Modeling Project

Task	Quantity	Units	Unit Price ($)	Total Cost ($ x1000)	Assumptions
Install Additional Monitoring Wells	25	Each	80,000	**2,000**	Multi-completion wells, includes geologist, mapping, recorder
Develop Groundwater Model	1	Lump Sum	300,000	**300**	
			Long-term Program Cost Subtotal ->	2,300	
			Contingency (30%) ->	690	
			Total Long-term Cost ->	**2,990**	

Other Sources of Funding

Partial funding has been secured for the proposed monitoring program. The AB 303 grant program is committed to providing $250,000. The grant would be used for the installation of four new monitoring wells. Currently, Glenn County does not have the financial resources to support the entire proposed program in a timely manner. Therefore, requested additional funding totals $5.25 million.

4. Environmental Issues

This project is primarily an exercise in data collection and analysis. No physical impacts are anticipated to occur as a result of the project, although the results of the project may lead to the development of future projects. It is anticipated that the appropriate level of environmental documentation for the project would be a Categorical Exclusion/Categorical Exemption, requiring a very minimal degree of effort.

A draft California Environmental Quality Act (CEQA) environmental checklist has been prepared for this proposed project and is included as an attachment to this evaluation. The checklist provides a preliminary assessment of the environmental areas of concern, as well as areas that are not likely to be of concern, associated with this project. The checklist would be finalized as part of the environmental compliance required for project implementation.

5. Implementation Challenges

There are serious concerns about the long-term drawdown of the groundwater table and land subsidence as a result of any conjunctive use program. The proposed model development would help determine the effects of increased groundwater pumping. Local involvement would be required to get any conjunctive use project implemented, and the proposed monitoring and modeling program may be the vehicle for public involvement. If the general public is familiar with model development through outreach at irrigation district landowner meetings or other meetings, then the model results may have more local credibility and support when prospective conjunctive use programs are evaluated.

Long-term exporting of in-basin water supplies is a sensitive political issue. Estimates of local benefits and exported water would have to be a part of any future conjunctive use program. The local opposition would likely increase if the water produced is mostly for export. A public outreach program incorporated with the monitoring and modeling program may be required to address public perception.

Key Stakeholders

Table 5E-4 describes many key stakeholders that would be involved with the implementation process. Many of the listed stakeholders would be providing historical groundwater data and ongoing monitoring for the clearinghouse. All of the listed stakeholders should be involved with establishing the objectives of the Stony Creek groundwater model. The future implications of the Glenn County monitoring and modeling program would likely involve all of these stakeholders with regard to the impacts and benefits of a conjunctive use project.

TABLE 5E-4
Stakeholder Roles and Issues
Glenn-Colusa Irrigation District Glenn County Groundwater Monitoring and Modeling Program

Stakeholder	Role	Issues
GCID	Project lead and potential groundwater developer	Quantify potential for development and safe yield; protect existing surface water rights, overdraft, and land subsidence; provide groundwater data
Glenn County	Eventual project lead; maintain data clearinghouse	Determine impacts on the county; maintain county economic base; enforce groundwater ordinance and BMOs
OUWUA	Potential groundwater developer	Same as GCID
OAWD	Potential groundwater developer	Same as GCID
TCCA	Potential groundwater developer	Same as GCID
City of Orland	Protect municipal water supply	Groundwater levels

TABLE 5E-4
Stakeholder Roles and Issues
Glenn-Colusa Irrigation District Glenn County Groundwater Monitoring and Modeling Program

Stakeholder	Role	Issues
Hamilton City	Protect municipal water supply	Groundwater levels
City of Willows	Protect municipal water supply	Groundwater levels
City of Artois	Protect municipal water supply	Groundwater levels
South-of-Delta exporters	Potential benefactor of new supply	Non-utilized surface water available for export?
Various local interest groups	Protect local economy	Would the new water be exported?
Environmental Interests	Habitat protection for Sacramento River and Delta	What is effect on Sacramento River and Delta inflow? Timing, temperature, quantity?
DWR	ISI lead; groundwater monitoring	Coordination with ISI program; support data clearinghouse
USBR, University of California, USGS	Groundwater monitoring	Support data clearinghouse

6. Implementation Plan

This project is ready to proceed upon complete funding. Assuming that the project would begin in January 2002, the estimated completion date is December 2005. The time schedule includes 1 year to develop the clearinghouse, 6 months to analyze data, 1 year to install the monitoring system, and 1 year to develop the model. The schedule includes 3 years of maintaining the established data clearinghouse.

Implementation must include coordination with the DWR ISI program, which is initiating groundwater model development in the Stony Creek Fan. Coordination should prevent duplication of cost-intensive modeling efforts.

This project has strong ties to other proposed Sacramento Valley Water Management Agreement projects in the Colusa Basin. The proposed Glenn County monitoring and modeling project is directly tied to any proposed conjunctive use programs in the Stony Creek Fan area including the Stony Creek Fan Conjunctive Water Management Program, OUWUA and TCCA Regional Water Use Efficiency, and the GCID Development of Conjunctive Water Management Facilities. Coordination with these projects would be essential.

Funding provided by the Sacramento Valley Water Management Agreement could be phased similar to the proposed schedule. The most costly task would be the installation of approximately 50 new monitoring wells to begin in June 2003, which would last approximately 1 year. Figure 5E-2 shows the general project cost and preliminary timeline for the monitoring and modeling project.

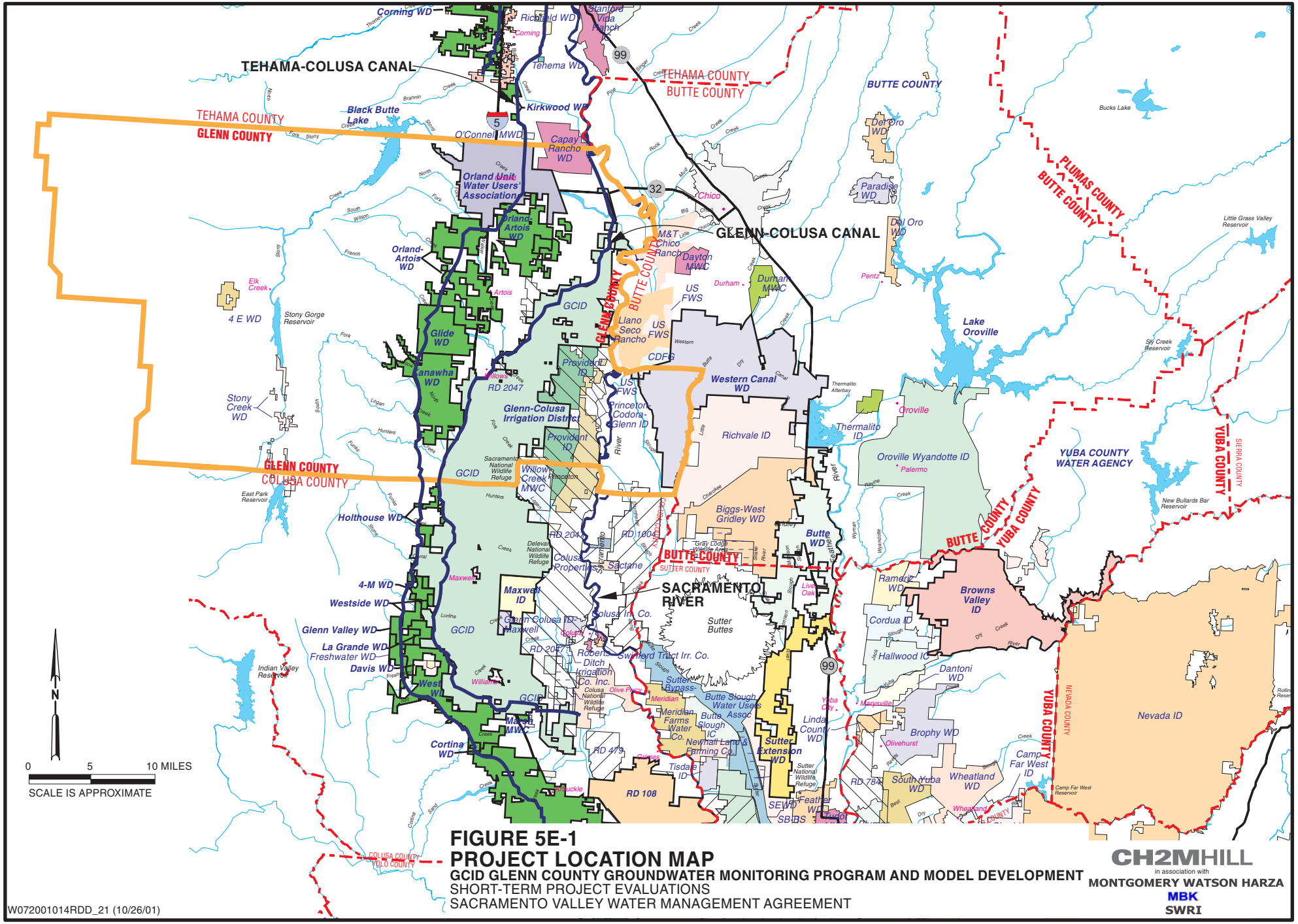

FIGURE 5E-1
PROJECT LOCATION MAP

GCID GLENN COUNTY GROUNDWATER MONITORING PROGRAM AND MODEL DEVELOPMENT

SHORT-TERM PROJECT EVALUATIONS

SACRAMENTO VALLEY WATER MANAGEMENT AGREEMENT

W072001014RDD_21 (10/26/01)

CH2MHILL
in association with
MONTGOMERY WATSON HARZA
MBK
SWRI

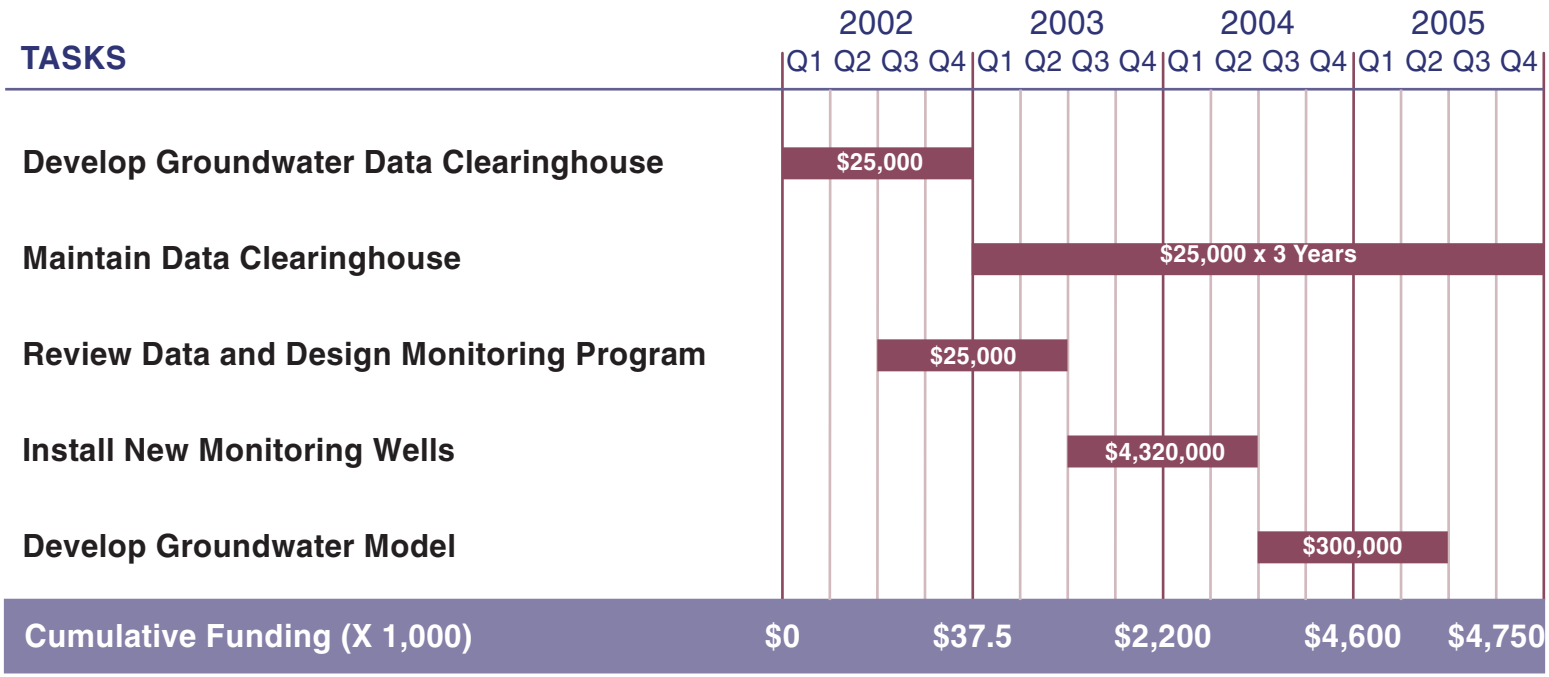

FIGURE 5E-2
PRELIMINARY IMPLEMENTATION SCHEDULE
GCID GLENN COUNTY GROUNDWATER MONITORING PROGRAM AND MODEL DEVELOPMENT
SHORT-TERM PROJECT EVALUATIONS
SACRAMENTO VALLEY WATER MANAGEMENT AGREEMENT

CH2MHILL
in association with
MONTGOMERY WATSON HARZA
MBK
SWRI

W072001014RDD_09 (10/26/01)

Project 5E—Draft CEQA Environmental Checklist

Project 5E—Environmental Factors Potentially Affected:

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

☐ Aesthetics	☐ Agriculture Resources	☐ Air Quality
☐ Biological Resources	☐ Cultural Resources	☐ Geology/Soils
☐ Hazards & Hazardous Materials	☐ Hydrology/Water Quality	☐ Land Use/Planning
☐ Mineral Resources	☐ Noise	☐ Population/Housing
☐ Public Services	☐ Recreation	☐ Transportation/Traffic
☐ Utilities/Service Systems	☐ Mandatory Findings of Significance	

Determination:

(To be completed by the Lead Agency)

On the basis of this initial evaluation:

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☐ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☐ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

_____ _____

Signature Date

_____ _____

Printed Name For

Issues:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
I. AESTHETICS—Would the project:				
a) Have a substantial adverse effect on a scenic vista?	☐	☐	☐	☒
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☐	☒
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☐	☒	☐
d) Create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area?	☐	☐	☐	☒
II. AGRICULTURE RESOURCES—Would the project:				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☒	☐
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☒	☐
c) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use?	☐	☐	☒	☐
III. AIR QUALITY—Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☒	☐
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☐	☐	☒	☐
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors).	☐	☐	☐	☒
d) Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☐	☒
e) Create objectionable odors affecting a substantial number of people?	☐	☐	☐	☒
IV. BIOLOGICAL RESOURCES—Would the project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☒	☐	☐
Up to 50 new monitoring wells may be necessary to adequately monitor the Stony Creek Fan. These wells may be required to be placed in environmentally sensitive areas. The wells would be sited to minimize any disruption of local habitat areas.				

Issues:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or US Fish and Wildlife Service?	☐	☒	☐	☐
See response to IV (a) above.				
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act, (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	☒	☐
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or, impede the use of native wildlife nursery sites?	☐	☐	☒	☐
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☒	☐	☐
See response to IV (a) above.				
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?.	☐	☐	☒	☐
V. CULTURAL RESOURCES—Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?	☐	☒	☐	☐
A significant impact would occur if a cultural resource were to be disturbed by activities associated with project development. In the event that an archaeological resource was discovered, appropriate measures would be undertaken to minimize any impacts.				
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	☐	☒	☐	☐
See response to V (a) above.				
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☒	☐	☐
See response to V (a) above.				
d) Disturb any human remains, including those interred outside of formal cemeteries?	☐	☒	☐	☐
See response to V (a) above.				
VI. GEOLOGY AND SOILS—Would the project:				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☐	☒

Issues:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
ii) Strong seismic ground shaking?	☐	☐	☐	☒
iii) Seismic-related ground failure, including liquefaction?	☐	☐	☐	☒
iv) Landslides?	☐	☐	☐	☒
b) Result in substantial soil erosion or the loss of topsoil?.	☐	☐	☒	☐
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?	☐	☐	☐	☒
d) Be located on expansive soil, as defined in Table18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	☐	☐	☐	☒
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	☐	☐	☐	☒
VII. HAZARDS AND HAZARDOUS MATERIALS— Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☒	☐
Construction equipment would require the use of potentially hazardous materials. The potential for significant hazardous material spill is unlikely because of the limited amount of such materials that would be used onsite. If a spill or release of such materials were to occur, it could potentially be significant unless best management practices were implemented.				
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☐	☒	☐
See response to VII (a) above.				
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	☒
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☐	☒
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒

Issues:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.	☐	☐	☐	☒
h) Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	☐	☒
VIII. HYDROLOGY AND WATER QUALITY— Would the project:				
a) Violate any water quality standards or waste discharge requirements?	☐	☐	☒	☐
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted). *There are serious concerns about the long-term draw-down of the groundwater table and land subsidence. Model development would help in determining the effects of increased groundwater pumping. Minimal pumping of groundwater would occur as a result of the monitoring program and model development; however the impact is considered less than significant to groundwater supplies.*	☐	☐	☒	☐
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?	☐	☐	☐	☒
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?	☐	☐	☐	☒
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☐	☐	☒	☐
f) Otherwise substantially degrade water quality?	☐	☐	☒	☐
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☐	☒
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	☐	☐	☐	☒
i) Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☐	☐	☒
j) Inundation by seiche, tsunami, or mudflow?	☐	☐	☐	☒
IX. LAND USE AND PLANNING—Would the project:				
a) Physically divide an established community?	☐	☐	☐	☒

Issues:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☒	☐
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☐	☒	☐
X. MINERAL RESOURCES—Would the project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☒
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☐	☐	☒
XI. NOISE—Would the project result in:				
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.	☐	☒	☐	☐
Short-term noise levels are expected to increase for the duration of construction of each monitoring well. These noise increases would be temporary, and mitigation measures would be implemented to reduce any impact to a less than significant level.				
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels.	☐	☐	☐	☒
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☐	☒
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.	☐	☒	☐	☐
See response to XI (a) above.				
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒
XII. POPULATION AND HOUSING—Would the project:				
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure).	☐	☐	☐	☒
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

Issues:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒
XIII. PUBLIC SERVICES—Would the project:				
a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services?	☐	☐	☐	☒
Fire protection?	☐	☐	☐	☒
Police protection?	☐	☐	☐	☒
Schools?	☐	☐	☐	☒
Parks?	☐	☐	☐	☒
Other public facilities?	☐	☐	☒	☐
XIV. RECREATION—Would the project:				
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☒
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities, which might have an adverse physical effect on the environment?	☐	☐	☐	☒
XV. TRANSPORTATION/TRAFFIC—Would the project:				
a) Cause an increase in traffic, which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?	☐	☐	☒	☐
b) Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?	☐	☐	☒	☐
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	☐	☐	☐	☒
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☐	☒
e) Result in inadequate emergency access?	☐	☐	☐	☒
f) Result in inadequate parking capacity?	☐	☐	☐	☒
g) Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?	☐	☐	☐	☒

Issues:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
XVI. UTILITIES AND SERVICE SYSTEMS— Would the project:				
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☐	☒
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☐	☐	☒
e) Result in a determination by the wastewater treatment provider, which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☐	☒
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☒	☐
g) Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☒	☐
XVII. MANDATORY FINDINGS OF SIGNIFICANCE				
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	☒	☐	☐
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	☐	☐	☒	☐
c) Does the project have environmental effects, which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☐	☒	☐